

VU Research Portal

The dynamics of agglomeration processes and their contribution to regional development across the EU

Dirzu, M.S.; Nijkamp, P.

2013

document version

Early version, also known as pre-print

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Dirzu, M. S., & Nijkamp, P. (2013). *The dynamics of agglomeration processes and their contribution to regional development across the EU*. (Research Memorandum; No. 2013-10). Faculty of Economics and Business Administration.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

The dynamics of agglomeration processes and their contribution to regional development across the EU

Research Memorandum 2013-10

**Madalina-Stefania Dirzu
Peter Nijkamp**

The Dynamics of Agglomeration Processes and their Contribution to Regional Development across the EU¹

Madalina-Stefania Dirzu

*Alexandru Ioan Cuza University of Iași, Faculty of Economics and Business Administration,
Centre for European Studies, Iasi, Romania
dirzu_madalina@yahoo.com*

Peter Nijkamp

*VU University, Department of Spatial Economics, Amsterdam, The Netherlands
A. Mickiewicz University, Poznan, Poland
p.nijkamp@vu.nl*

Abstract

A closer look at the spatial distribution of industrial sectors in a country shows that there is a persistent trend for industries to cluster in certain regions in order to benefit from agglomeration advantages. It is therefore important to analyse how industrial agglomerations evolve over time and the extent to which agglomeration processes have an effect on lagging regions, in particular in central and eastern countries (CEECs) in Europe. The existence of industrial agglomerations has been broadly analysed in many advanced economies, such as the USA, Japan and Western Europe, but less so in the less developed parts of Central and Eastern Europe. The present paper aims to gain new knowledge on agglomerations in non-Western European countries in general, and in lagging regions in particular. Many transition economies provide intriguing cases from this point of view, as for several decades they have experienced an economic development that was governed by a centralized industrialization policy. Hence, in the present study, we explore the issue of industrial agglomeration and its link to economic growth in the less developed regions in Eastern Europe. First, we present various theoretical arguments, and subsequently we offer empirical evidence as to why we may expect a positive relationship between industrial agglomeration and regional growth. Focusing on the 2-digit industries of 268 regions during the period 2001-2007 in the EU27, this paper aims to explain the emergence of industrial agglomerations in the past years across CEECs compared with the EU15. In order to obtain a more detailed picture of the sectoral and local effects on the number of employees, a shift-share analysis was carried out. This investigation was succeeded by a regression analysis to identify the forces at work. This study allows us to trace the manner in which agglomeration forces can improve regional development within the EU.

Key words: agglomeration economies, regional growth, geographic concentration, shift-share analysis, regression model

¹ The authors wish to thank Martijn Smit and Henri de Groot for their suggestions regarding this paper.

Introduction

It has long been known that economic activities are unevenly distributed across space (Tobler, 1970). A large body of literature on economic geography has evolved which attempts to explain why there is a strong tendency for industries to cluster in particular regions in order to exploit the locational dynamics generated by agglomeration forces. Following this approach, agglomeration processes, the spatial concentration of economic activities in a specific field in a certain region connected through diverse sorts of liaisons (from knowledge spillovers to the use of a common skilled labor market), are increasingly perceived as paramount to comprehend the economic power or competitiveness of a region. With this background, it seems vital to explore how industrial agglomerations have developed over time and the extent to which agglomeration assets can provide a meaningful economic contribution to the catching-up regions of central and eastern countries (CEECs) and to Western countries as well. Despite the fact that the phenomenon of industrial agglomeration has been thoroughly examined in many advanced economies such as the USA, Japan or Western Europe (De Groot et al. 2009), our aim here is oriented toward the less developed areas of Eastern Europe. Hence, the present study can be perceived as making a significant addition to the knowledge about agglomeration in non-Western European countries in general, and in lagging regions in particular. CEECs seem to present an ideal setting for studying this topic, especially because they have endured a long economic development period of several decades, which was influenced by socialist industrialization. Before 1990, these countries were subjected to a central planning system and most economic activities, including location choice, were decided by the central government, which was considerably influenced by political considerations. Under the planned economy, many CEECs faced severe barriers to an efficient geographical allocation of economic activities across their regions as compared with other regions in the EU15, especially because they were confronted with the legacy of a planned economy that determined locations for economic activity on the basis of political decisions, without due regard to economic efficiency. The changing economic environment in CEECs after 1990 permits us to examine the relationship between industrial agglomerations and regional growth. Hence, in the present paper, we focus our attention on examining the issue of industrial agglomeration and its link to economic growth in the less developed regions of Eastern Europe.

We aim to investigate which industrial agglomerations in which regions have grown fastest between 2001 and 2007, and why. To shed light on this topic, we disclose theoretical arguments and secondary empirical evidence for why we should have reasonable expectations about finding a positive connection between agglomeration and economic growth. Focusing on the 2-digit industrial sectors of 268 regions at the NUTS2 level from 2001 to 2007 in the EU27, the aim of this paper is to explain the changes regarding the evolution of industrial agglomerations in the past years across CEECs compared with Western Europe, i.e. the EU15. Specifically, in order to provide a more integrated image of the local and sectoral implications for the growth of the number of employees in each sector and region, a standard shift-share analysis will be used as a tool for the regional selection of key leading industries. Once completed, the analysis will provide a evidence-based representation of the dynamics of employment growth and decline, which makes it useful for targeting industrial agglomerations capable of providing regional growth within the EU. Lastly, based on a regression analysis, in which we include several explanatory variables that may have an impact on regional development, we will in the concluding part of this paper elucidate the manner in which agglomeration assets can improve regional development across the EU.

The remainder of this paper is organized as follows. Section 2 presents the theoretical background and some selected empirical evidence related to the relationship between agglomeration processes and regional development. Section 3 offers an overview of the data set while Section 4 is dedicated to describing the methodology used for our empirical analysis. Next, Section 5 presents the results of our econometric analysis of the agglomeration effects on regional development across the EU. Section 6 concludes.

Theoretical background and empirical evidence

The importance of industrial agglomerations in achieving regional economic growth has long been discussed in the field of regional science and urban economics. There are reasonable motives to believe that a strong connection exists between the agglomeration of economic activities and the economic growth of a region. Economic growth may be stimulated by the agglomeration of industrial activities through the contribution of, for instance, a higher degree of knowledge spillovers and larger local producer and consumer markets. The underlying principles for the phenomenon of agglomeration of economic activities in space can be explained by a rich

body of literature that took off with Alfred Marshall's work in 1890 entitled *Principles of Economics*. Since then, an important surge has taken place in the literature dedicated to this topic.

Furthermore, it is important to emphasize that this spatial concentration comes about mostly because of *agglomeration economies*. The term "agglomeration economies" denotes all economic benefits accruing to firms belonging to an agglomeration: reduced production costs, presence of advanced and specialized services, presence of a skilled labour force, broad and specialized intermediate goods markets, and so on. Hence, agglomeration economies represent "an engine of growth" (Romer, 1986; Lucas, 1988). These particular advantages specific to agglomerations are often categorized as so-called *localization economies* and *urbanization economies*. Concretely, the term "localization economies" refers to efficiencies that arise from the concentration of firms in the same sector, while "urbanization economies" implies efficiencies that accrue from the agglomeration of various kinds of activities in a given region. In the vocabulary of recent researchers, these two types of economies are denoted by the headings *Marshall–Arrow–Romer (MAR) externalities* and *Jacobs externalities* (Glaeser et al., 1992). Specifically, 'MAR externalities' refer to knowledge spillovers generated among companies agglomerated in a single spatially concentrated industry. Additionally, Porter highlights the relevance of localization economies, sustaining the conviction that knowledge spillovers in geographically agglomerated industries foster growth. Unlike the MAR approach, the Jacobs framework defines diversity as a crucial source of agglomeration economies, arguing that the most valuable knowledge transfers come from outside the own industry. As a result, it is the variety and diversity of the geographical concentration of different industries that promote growth, rather than the concentration of a single industry. However, all these divergent approaches are extremely appealing, because they try to explain why regions characterized by agglomeration exhibit higher growth rates than regions without such valuable features.

Considering these, the phenomenon of regional growth is strongly connected to the existence of agglomeration economies, namely, positive agglomeration effects that result from the spatial concentration of industries, such as advantages from a specialized labour market, specialized intermediate products and knowledge spillovers. While the literature on (endogenous) economic growth (see Aghion and Howitt, 1998) tends to ignore the influence that the agglomeration of economic activities may have on economic growth – focusing on other

drivers of economic growth, such as technological development driven by the accumulation of knowledge, capital accumulation and institutions – the emergence of the models of the “new economic geography” revived the scientific interest in the determinants of agglomeration and its consequences for economic activity. Commencing with the study by Krugman (1991), this line of literature perceives the presence of transportation costs in combination with factor and/or firm mobility and congestion costs as the vital driving force behind the level of agglomeration in the economy. Recently, these two strands of literature have been integrated into a robust theoretical framework. Baldwin and Forslid (2000), Baldwin et al. (2001) and Fujita and Thisse (2002) all integrated insights from the endogenous growth literature (Romer, 1990) and the new economic geography literature (Krugman, 1991) into a model that considers both agglomeration and economic growth. A complete overview of these sorts of models is provided in a survey paper by Baldwin and Martin (2004). In a nutshell, these models imply that agglomeration has a positive impact on growth, and that the growth rate of the economy as a whole is highest in a steady state with economic activity agglomerated in one region only. Following this approach, agglomeration seems to have several advantages for both consumers and producers that lead to favourable conditions for economic growth. A larger market size and a higher degree of knowledge spillovers are both examples of features of agglomerations that may stimulate economic growth. On the other hand, it must be specified that there might be obstacles on the road to regional development based on industrial agglomeration, especially because of sclerotic industrial agglomeration (too many small firms) and a reduced technological level (a lower limit of the high-tech sector) (Ciccone and Hall, 1996).

Despite these theoretical backgrounds, the empirical link between agglomeration and economic growth has attracted little interest in the empirical literature on economic growth. Two of the first studies to shed light on this relation were provided by Ciccone and Hall (1996) and Ciccone (2002). These studies estimated the relationship between economic activity, measured by total factor productivity, and agglomeration, quantified by employment density, for the USA at the state level (Ciccone and Hall, 1996) and for five European countries at the regional level (Ciccone, 2002) and discovered a positive contribution of agglomeration (both in the region itself and in neighbouring regions) on economic activity.

More recently, two other papers (Sbergami, 2002; Crozet and Koenig, 2005) have estimated the effect of agglomeration, measured by the dispersion of economic activity within a

region, on economic growth, measured by GDP per capita. Sbergami (2002) performed a growth regression analysis for a panel of six European countries and twelve years, adding an index for agglomeration, and discovered a negative impact of agglomeration even after correcting for other potential determinants of economic growth. On the contrary, Crozet and Koenig (2005) discovered a positive effect of agglomeration at the regional European level. Clearly, there is a need for a solid empirical study of the forces at work. And this will be the main task for the remaining part of this paper.

Data

Our empirical analysis considers EU regions, over the period 2001 to 2007. The full sample of regions includes 268 NUTS2–level regions. Cyprus, Estonia, Latvia, Lithuania and Malta are considered to be one-region countries. The data on EU regions are taken from Eurostat’s regional database, which is based on the Eurostat regional time series. The database is constructed across three main dimensions: industrial sectors, regions and years. The measures of the degree of spatial agglomeration are based on employment data. Due to the fact that comprehensive data are limited, we chose 2001 as the initial year for our analysis, approximated as the average over 2000 to 2002. Concerning the year 2007, this was the last year available. The regional employment data distinguish between 47 industries based on a 2-digit sector classification sector, which, in turn, is based on the statistical classification of sectors in the European Union in 2006.

Moreover, to provide a more complete indication of the data used in the empirical section of this paper, a detailed definition of the variables and descriptive statistics used in the econometric analysis is reported in Table 1.

Methodology

A regional economy incorporates various industries with distinctive economic potentials. Taking into consideration the fact that industries represent an important basis of a region’s economy, any growth or decline in each of these industrial sectors impacts on the global growth of the economy. An investigation into the economic growth by sector of a certain region helps researchers and policy makers in facilitating better decision making and problem solving. The dynamic and changing regional economies have been attracting the interest of many researchers

(Knudsen, 2000). Given the fact that diverse sectors affect the economic growth of a particular region differently, comprehending the comparative advantage of these specific sectors becomes vital in the development decisions of the region (Deming, 1996). Thus, it seems crucial to determine the competitiveness of a particular region in economic development endeavours. The identification of the comparative advantage of various sectors becomes more important in lagging regions than in the developed regions. This is the reason why Central and Eastern European countries seem to present a good setting for this analysis.

Table 1. Definition and descriptive statistics of the variables used in the empirical analysis

Variable	Name	Description	Descriptive statistics		
			Mean	Median	S.D.
Initial employment	AV2001	Average number of employees in a sector in 2001 (approximated as the average over 2000 to 2002)	11368.78	2976	28514.3
Concentration employment	CONCENTR	Location quotient, 2001	1.30	0.76	5.41
Diversity	REGDIV	One minus the Hirschman–Herfindahl index of the sectoral distribution, 2001	0.9	0.06	0.91
Population density	POPDENS2001	Population per km ² , 2001	365.92	137.1	874.63
GDP per capita	GDP2001	Regional gross domestic product (PPS per inhabitant), 2001	18705.27	18900	7764.07
Human capital	STUDRATE2001	Students (ISCED 5-6) at the regional level – as % of the total country–level students (ISCED 5–6) in 2001	45.8	44.65	23.8
Country capitals	CAPITAL	Dummy for regions that contain a national capital	0.06	0	0.24
Competitiveness effect	Competitiveness effect	The difference between the actual change in employment and the employment change to be expected, if each industrial sector grows at the national rate.	-248.32	0	9000

Legend: S.D. stands for standard deviation

Source: compiled by the authors

In the framework of regional economic growth studies, all kinds of methods – like optimization techniques, shift-share analysis, economic base studies, input–output analysis, and benefit–cost analysis – have been used by regional scientists (Selting and Loveridge, 1994). Even though each model implies certain variations in measurement, precision, accuracy and complexity, each procedure has been utilized as an important compass for policy makers and researchers in their attempt to find the best solutions to regional issues (Hustedde et al. 2005). Shift-share analysis, in particular, compared with the other methods, is a widely used technique for the analysis of regional economies, in which empirical analyses are substantially limited by difficult access to data (Knudsen, 2000).

Consequently, shift–share analysis (Dunn, 1960) has become a popular instrument in regional analysis. Its wide usability stems from its facility to capture significant changes in the variables under consideration. Stevens and Moore (1980) advanced one important factor to account for its popularity: the procedure is technically incomplex. Shift-share analysis requires relatively modest amounts of data that are generally accessible, making the resulting analysis prompt and reasonably accurate (Nazara and Hewings, 2004). In the standard framework, shift-share analysis decomposes a region’s sectoral growth into three effects over a certain period. In this paper, employment will be used as the variable of interest to illustrate this shift-share decomposition. These three distinct effects are: (1) the *national growth effect (NE)*, which is the part of the change in total employment in a region ascribed to the rate of growth of employment at the national level; (2) the *industrial mix effect (IM)*, which is the amount of change the region would have experienced if each of its industrial sector had grown at the national rate, less the national growth effect; and (3) the *competitive effect (CE)*, which is the difference between the actual change in employment and the employment change to be expected if each industrial sector would grow at the national rate. The sum of these three effects gives the actual change in total employment within a region over a considered time period.

Since our study is concerned with regional employment in the European Union, let us denote the rate of variation of employment in sector i ($i=1,\dots, S$) in region j ($j=1,\dots,R$) by the following expression:

$$r_{ij}=(E_{ij}^{t'} - E_{ij}^t)/E_{ij}^t \quad (1)$$

The sectoral rate of variation for i is:

$$r_i = (\sum_j E_{ij}^{t'} - \sum_j E_{ij}^t) / \sum_j E_{ij}^t \quad (2)$$

while the global rate of variation within the EU employment is:

$$r = (\sum_{i,j} E_{ij}^{t'} - \sum_{i,j} E_{ij}^t) / \sum_{i,j} E_{ij}^t, \quad (3)$$

where:

$E_{ir}^{t'}$ represents employment in sector i of region j in the last year of the analysis; and

E_{ir}^t represents employment in sector i of region j in the base year of the analysis.

The three components of the shift-share analysis are formulated as:

$$NE_{ir} = E_{ij}^t r \quad (4)$$

$$IM_{ir} = E_{ij}^t (r_i - r) \quad (5)$$

$$CE_{ir} = E_{ir}^t (r_{ij} - r_i) \quad (6)$$

Although shift-share analysis is heavily used in regional studies, there seems to be a general consensus that while the method is a useful way to conduct an initial analysis of regional growth, it is not an end in itself. Its purpose is more that of a framework for further analysis. In order to attain more fundamental explanations of the differential growth among various regions, a deeper examination is needed of the factors relevant to the competitiveness effect. Hence, while shift-share analysis identifies the industrial agglomerations in which a region has a competitive advantage (benefit), it cannot reveal which of the region-specific factors account for the competitiveness (disadvantage). Thus, agglomeration analysis using the shift-share technique provides useful information about the regional economy's strengths and weaknesses. However, as we specified previously, these are just the first steps. A causal model is needed as well. Consequently, shift-share analysis is useful for analysing historical employment patterns and identifying their causes through a regression analysis defined by a linear regression denoted by the next equation:

$$\begin{aligned} \text{Competitiveness effect} = & \alpha + \beta_1 \cdot \text{AV2001} + \beta_2 \cdot \text{CONCENTR} + \beta_3 \cdot \text{REGDIV} + \beta_4 \\ & \cdot \text{POPDENS2001} + \beta_5 \cdot \text{GDP2001} + \beta_6 \cdot \text{STUDRATE2001} + \beta_7 \cdot \text{CAPITAL} + \varepsilon \end{aligned} \quad (7)$$

Consequently, the second step in our study is based on a regression analysis, in which we include certain factors as explanatory variables that can make an important contribution to regional development, such as: the level of wealth (GDP per capita), urbanization (population density), human capital (level of education), labour force size (number of employees) and a geographical variable used as a dummy variable (countries' capitals). As other potential factors affecting economic growth in European regions, we also pay attention to regional industrial concentration (C_{irt}) calculated by using the location quotient and regional economic diversity (D_{rt}) calculated as an inverse Hirschman–Herfindahl index across regions. These measures read as follows, in relation to industry i , region r and time t :²

$$C_{irt} = \frac{L_{irt}/L_{i*}t}{L_{*rt}/L_{**}t} \quad (8)$$

$$D_{rt} = 1 - \sum_i (L_{irt}/L_{*rt})^2 \quad (9)$$

The location quotient represents a simple measure for determining the extent to which an industry is concentrated in an area relative to a larger benchmark region. The rationale underlying this index is that if the location quotient of an industry is greater than 1, the industry is “over-represented” in the case study region in comparison with the benchmark region. If the location quotient is less than 1, the activity is “under-represented” in the region. Moreover, regarding the inverse form of the Hirschman–Herfindahl index, it should be noted that we chose to write *one minus* the Herfindahl index of regional concentration of employment across sectors, to indicate the following direction of influence: the inverse Herfindahl index has a *higher* value for *higher* diversity. The empirical findings of our investigation will be given in the next section.

² We use L for total employment. An asterisk (*) denotes a summation over the index it replaces.

Empirical results

In this section we present the results from the shift-share projections of regional economic growth and from the regression analysis applied to our data set.

Using the shift-share method helped us in providing an overview of the contribution of industrial agglomerations to regional economic growth between 2001 and 2007. By focusing our attention on the regional shift or competitiveness effect, which is perhaps the most important component of shift-share analysis, the presence of a region's leading and lagging industries can be highlighted. The regional shift effect reflects the amount of additional regional employment that results from the concentration of a specific sector in a certain region. For those industrial agglomerations in which the region has a positive impact, the region exhibits a competitive advantage. In the next figures (see Figures 1-3), we map out the values of the competitiveness effect in some selected industries (i.e., computers, textiles, and R&D sectors), by presenting the additional number of employees in those regions where the industrial agglomerations outperformed their counterparts or not at the European scale from 2001 to 2007.

As we can see from the map in Figure 1, the Eastern European regions that have a competitive advantage in computer and related activities are especially the countries' capitals, such as Bucharest, Budapest, Warsaw and Prague. This aspect is not very surprising considering that these big cities have developed a large amount of ICT activities that have helped to boost the economic development in these areas. Thus, this sector seems to represent a part of the economy in which Eastern European countries have been particularly successful in developing true pockets of regional strength that employ significant numbers of people. Concerning Western Europe, the regions that manifest a competitive effect in this sector are Düsseldorf and Köln in Germany, Pays de la Loire, Bretagne, Provence-Alpes-Côte d'Azur in France, and Comunidad de Madrid in Spain.

In the next map (see Figure 2) we can observe which regions present a competitive effect in textiles. As we can easily observe from the above map, the regions that have a significant competitive effect in textiles are Łódzkie and Wielkopolskie in Poland and Lombardia in Italy. These results confirm the flourishing textiles industries in these two Polish regions, particularly around the end of the century. Furthermore, the region of Lombardia is famous for its fashion industry from Milano. *Per se*, many European regions seem to have a competitive advantage in

textiles, the only exceptions being a few regions from Romania, Hungary, Slovakia, France and England.

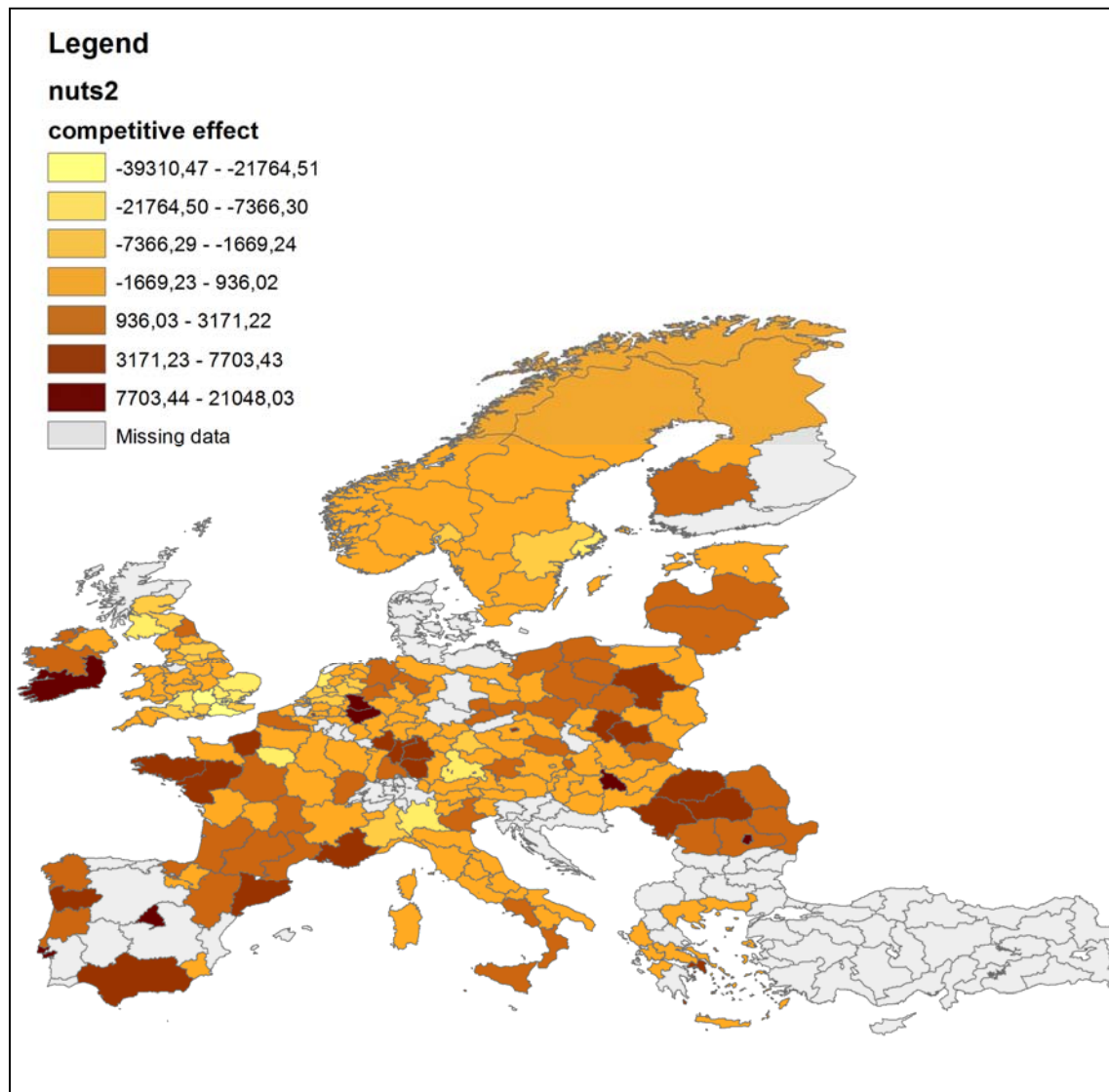


Figure 1. Competitive effect of European regions in computer and related activities
Source: compiled by the authors based on the shift-share results

The next map (Figure 3) provides a geographical representation of the European regions that have a competitive advantage in another important sector: research and development (R&D). Figure 3 shows clear differences between Eastern and Western Europe regarding the competitive effect that regions have in R&D. Specifically, the EU15 regions seem to possess a clear competitiveness advantage compared with their peers in the EU10. Partly, this is categorically a reflection of lower investments in this sector across Eastern European regions. However, given

the traditional relative strength of many of the EU10 countries in their education system, it is still an indication that the inheritance of a high skill level in these economies cannot be taken for granted.

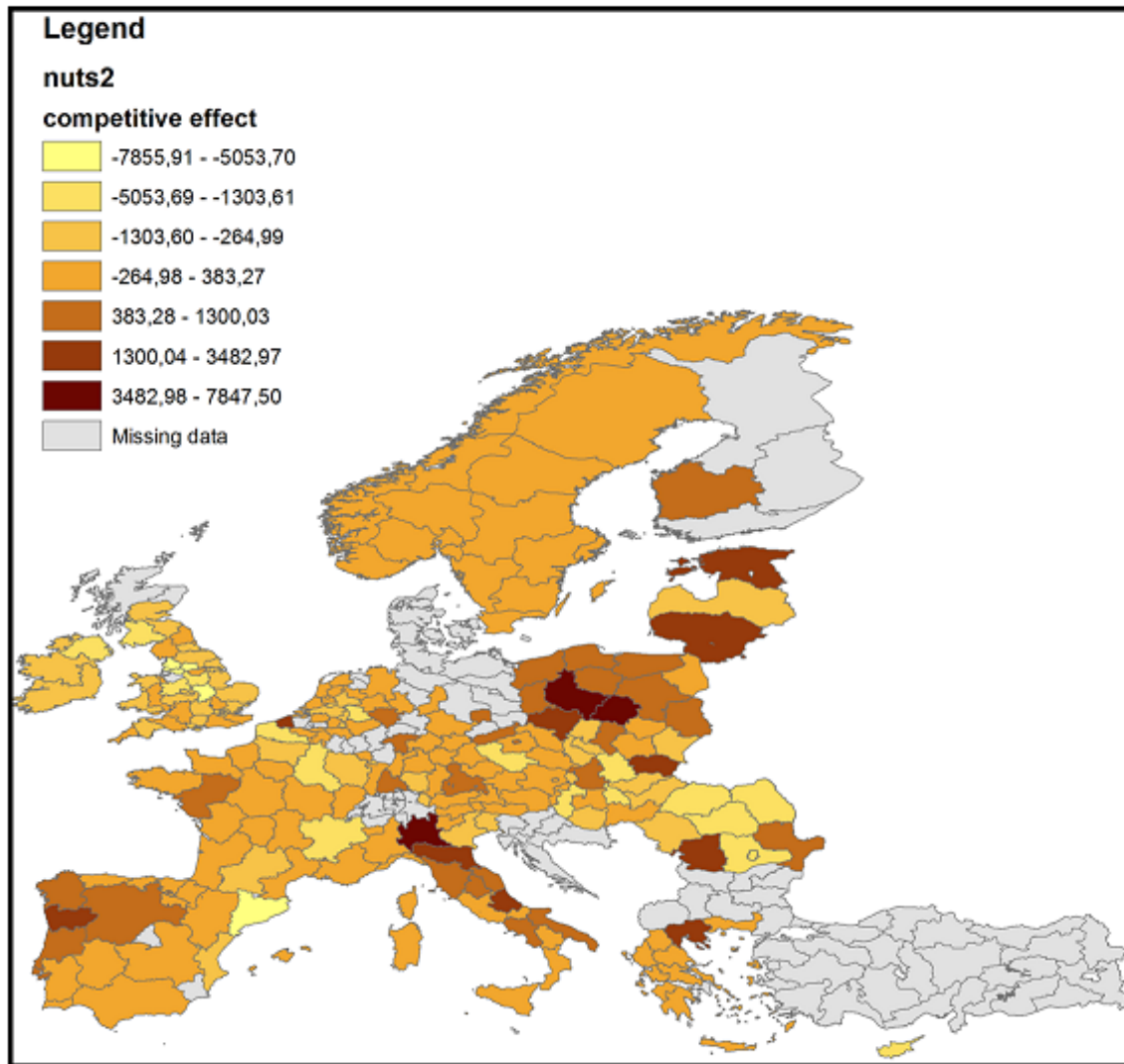


Figure 2. Competitive effect of European regions in textiles

Source: compiled by the authors based on the shift-share results

Overall, these data indicate the structural changes in the EU10 compared with those in the EU15, shifting employment towards agglomeration categories that have been traditionally under-represented (e.g., computer and related activities), that provided easy opportunities for new companies (e.g., textiles) and that leveraged the existing profile of competitiveness strengths and weaknesses (e.g., research and development). The overall changes in employment at the regional level by agglomeration category have been the result of any new individual industrial

agglomeration that outperformed its European counterpart or not during the expansionary period, 2001-2007.

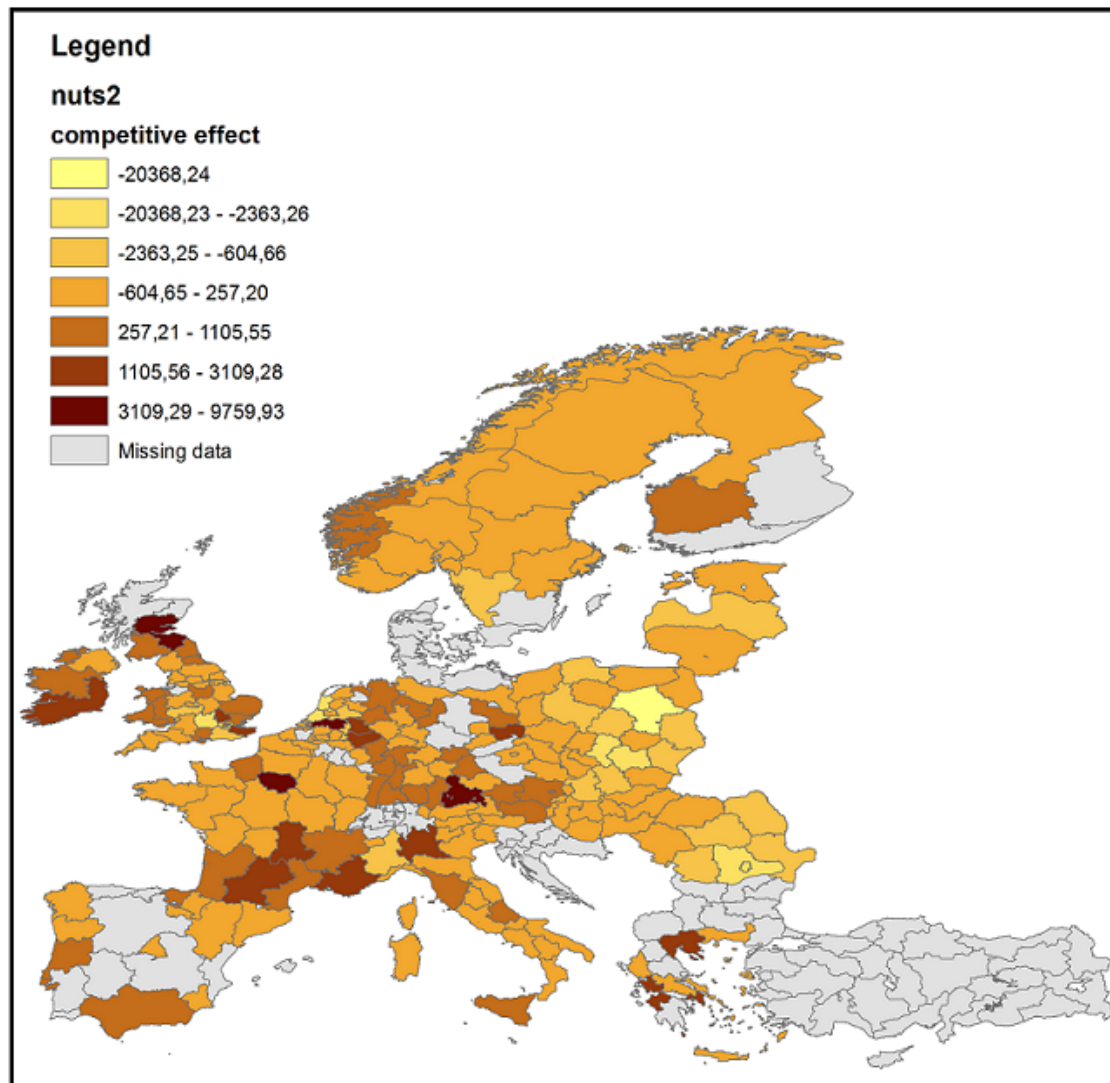


Figure 3. Competitive effect of European regions in research and development

Source: compiled by the authors based on the shift-share results

As stressed in the previous sections, the shift-share technique helped us to conduct an exploratory study. For a stepwise and complete examination, this 'crude tool' is next used in combination with a causal regression analysis to determine which factors explain a region's economic strength. To fulfil this explanatory objective, we estimated two regression equations for both Western and Eastern Europe, in which we used as a dependent variable the

competitiveness effect obtained from the shift-share analysis. The main results of our regression analysis for Western Europe can be observed in Table 2.

Table 2. Main results for Western Europe

Dependent: competitiveness effect			
	coeff.	t-values	p> t
AV2001	-.1996553	-43.58	0.000
CONCETR	1.577.384	1.95	0.051
REGDIV	7.902.416	2.05	0.040
POPDENS2001	-.0854669	-0.27	0.787
GDP2001	.0230771	0.48	0.630
STUDRATE2001	11.745	1.18	0.239
CAPITAL	1707.60	1.98	0.048
Constant	-6723.487	-1.96	0.050
Observations	1891		
R ²	0.51		

Source: authors' calculations

As we can see from the above table, initial employment has a significant negative effect on employment growth, which means: the higher the initial number of employees, the lower relative regional growth.

On the other hand, regional employment growth seems to be strongly influenced by localization and urbanization economies. Both concentration and diversity have a positive significant effect on growth. This evidence basically means that employment growth is faster in regions where there are industrial agglomerations in a specific sector, but also in regions where there are agglomerations among industries. These findings imply that both MAR knowledge externalities and Jacobs externalities are likely to occur in Western Europe. Overall, these regions might enjoy intra-sectoral spillover effects, but also inter-industrial externalities.

Moreover, in our regression analysis concerning Western Europe, more urbanized regions do not outperform than populated regions, the coefficient of population density being insignificant. Neither the high degree of welfare nor the level of education seem to have a major impact on regional growth, the coefficients of both GDP per capita and study rate having no significance.

On the contrary, Western Eueuropean countries' capitals seem to have a significant positive effect on regional growth. These results are not surprising taking into consideration the fact that the most dynamic evolution of positive spillovers accrues in these developed metropolitan areas.

The estimation results for Eastern Europe are summarized in the table below (see Table 3). As we can observe from this table, regarding the first explanatory variable, we face here the same situation as in the Western-European case. Also for Eastern Europe, initial employment has a significant negative effect on employment growth; consequently, the higher the number of employees, the lower relative regional growth.

Table 3. Main results for Eastern Europe

Dependent: competitiveness effect			
	coeff.	t-values	p> t
AV2001	-.2348645	-12.91	0.000
CONCENTR	-12.0438	-0.47	0.637
REGDIV	41252.73	3.03	0.003
POPDENS2001	2.160225	1.94	0.053
GDP2001	-.3414208	-3.67	0.000
STUDRATE2001	60.98411	2.87	0.004
CAPITAL	-229.9311	-0.10	0.918
Constant	-34252.79	-2.65	0.008
Observations	798		
R ²	0.24		

Source: authors' calculations

On the contrary, regarding the MAR and Jacobs frameworks, things seem to be different in the East. First of all, concentration in a specific industry has an insignificant effect on regional growth, meaning that intra-industrial spillovers are less relevant to a region's growth. These findings imply that employment growth is faster in regions characterized by an agglomeration among various industries and those that have a more competitive local sectoral structure. Overall, inter-industrial spillovers appear to be very important for employment growth; the coefficient of our diversity is in this case significant.

Furthermore, for Eastern Europe, more urbanized regions seem to outperform less populated regions, the coefficient of population density being significant. A reasonable

explanation for this result is likely the dynamic exchange of knowledge spillovers that occur in denser regions.

Regarding the level of GDP per capita, this variable seems to have a significant negative effect on regional growth. This is because poorer regions tend to develop more rapidly than wealthy regions.

Another important variable that exhibits a significant positive impact on regional growth is the level of education. A higher rate of students in tertiary education seems to demonstrate a favorable effect on regional employment growth because the labour force in Eastern Europe is cheap and at the same time considerably productive.

Regarding the last independent variable, it appears that Eastern-European capitals do not exert a significant impact on regional growth. How can we explain this intriguing result? It seems plausible that the negative externalities associated with major metropolitan areas such as congestion, higher housing prices and intense competition outweigh here the positive effects.

Conclusions

In the present paper, we have sought to explore the interconnection between industrial agglomeration and regional growth across the EU, paying special attention to less developed regions from Eastern Europe. We have carried out an explorative analysis on the basis of theoretical arguments, references to the literature, and a series of empirical investigations focused on interesting cases in Europe. Clearly, the quality of the data on which the latter examinations are based leaves much to be desired.

Based on a shift-share analysis, our study was able to identify those industrial agglomerations that seem to outperform others in various regions during the period 2001 to 2007, these particular regions thus having a competitive advantage. Because the shift-share method does not account for the prominent factors responsible for a region's growth, we resorted at the end to regression analyses for both Western and Eastern Europe. Here, we discovered that both MAR and Jacobs externalities have a positive impact on regional growth in the case of Western European regions. On the other hand, our findings revealed that intra-industrial spillovers are insignificant for Eastern European regions, while inter-industrial spillovers seem to make a major contribution to regional growth in this part of Europe. Moreover, urbanization and the level of education proved to have a positive impact on regional growth in the East and an

insignificant influence in the West. Another interesting result was the positive effect of Western European countries' capitals on regional growth, while Eastern-European capitals seem to be less relevant in this context.

We conclude that our outcome is of special interest, because it concerns situations from Central and Eastern Europe that are considerably different from the common case-study material found in the literature, which is generally centred on developed Western economies. Of course, much supplementary work is necessary to offer a more robust clarification of the important questions raised in the present study.

Acknowledgement

This work was supported by the European Social Fund in Romania, under the responsibility of the Managing Authority for the Sectorial Operational Programme for Human Resources Development 2007-2013 [grant POSDRU/CCP 107 DMI 1.5/S/78342].

References

- Aghion, P. and Howitt, P. (1998), *Endogenous Growth Theory*, Cambridge, MA, MIT Press.
- Baldwin, R. and Forslid, R. (2000), "The core periphery model and endogenous growth: stabilising and destabilising integration", *Economica*, Vol. 67, pp. 307–324.
- Baldwin, R. and Martin, P. (2004), Agglomeration and regional growth, in: V. Henderson and J. Thisse (eds.) *Handbook of Regional and Urban Economics*, Amsterdam, Elsevier Science, Vol. 4, pp. 2671–271.
- Baldwin, R., Martin, P. and Ottaviano, G. (2001), "Global income divergence, trade and industrialization: the geography of growth take-offs", *Journal of Economic Growth*, Vol. 6, pp. 5–37.
- Ciccone, A. (2002), "Agglomeration effects in Europe", *European Economic Review*, Vol. 46, pp. 213–227.
- Ciccone, A. and Hall, R. (1996), "Productivity and the density of economic activity", *American Economic Review*, Vol. 86, No. 1, pp. 57–70.
- Crozet, M. and Koenig, P. (2005), *The Cohesion vs Growth Tradeoff: Evidence from EU Regions*, Working paper, University of Paris.
- De Groot, H.L.F., Poot, J. and Smit, M.J. (2009), "Agglomeration, innovation and regional development: theoretical perspectives and meta-analysis", in R. Capello and P. Nijkamp (eds), *Handbook of Regional Growth and Development Theories*, Cheltenham, Edward Elgar, pp. 256–281.
- Deming, W.G. (1996), "Decade of economic change and population shifts in U.S. regions", *Regional Economic Changes*, Monthly Labor Review 3.
- Dunn, E.S. (1960), "A statistical and analytical technique for regional analysis", *Papers of the Regional Science Association*, Vol. 6, pp. 97–112.
- Fujita, M. and Thisse, J. (2002), *Economics of Agglomeration*, Oxford, Oxford University Press.
- Glaeser, E., Kallal, H.D., Scheinkman, J.D., and Shleifer, A. (1992), "Growth in cities", *Journal of Political Economy*, Vol. 100, No. 6, pp. 1126–1152.
- Hustedde, R., Shaffer, R. and Pulver, G. (2005), *Community Economic Analysis: A How To Manual*, Ames, Iowa State University Printing Services.
- Knudsen, D. C. (2000), "Shift-share analysis: further examination of models for the description of economic change", *Socio-Economic Planning Sciences*, Vol. 34, pp.177–198.
- Krugman, P. (1991), "Increasing returns and economic geography", *Journal of Political Economy*, Vol. 99, pp. 483–499.
- Marshall, A. (1890), *Principles of Economics*, London, Macmillan.
- Lucas, R. (1988), "On the mechanics of economic development", *Journal of Monetary Economics*, Vol. 22, pp. 3–42.
- Nazara, S. and Hewings, G.J.D. (2004), "Spatial structure and taxonomy of decomposition in shift-share analysis", *Growth and Change*, Vol. 35, No. 4, pp. 476–490.
- Romer, P. (1986), "Increasing returns and long-run growth", *Journal of Political Economy*, Vol. 94, pp. 1002–1037.
- Romer, P. (1990), "Endogenous technological change", *Journal of Political Economy*, Vol. 98, 71–102.
- Sbergami, F. (2002), *Agglomeration and Economic Growth: Some Puzzles*, HEI Working Paper No. 2, Graduate Institute of International Studies, Geneva.
- Selting, A.C. and Loveridge, S. (1994), "Testing dynamic shift share", *Journal of Regional Analysis and Policy*, Vol. 24, No. 1, pp. 23–41.
- Stevens, B.H. and Moore, C. (1980), "A critical review of the literature on shift-share as a forecasting technique", *Journal of Regional Science*, Vol. 20, No. 4, pp. 419–437.
- Tobler, W. (1970), "A computer model simulation of urban growth in the Detroit region", *Economic Geography*, Vol. 46, No. 2, pp. 234–240.

2009-1	Boriana Rukanova Rolf T. Wignand Yao-Hua Tan	From national to supranational government inter-organizational systems: An extended typology, 33 p.
2009-2	Marc D. Bahlmann Marleen H. Huysman Tom Elfring Peter Groenewegen	Global Pipelines or global buzz? A micro-level approach towards the knowledge-based view of clusters, 33 p.
2009-3	Julie E. Ferguson Marleen H. Huysman	Between ambition and approach: Towards sustainable knowledge management in development organizations, 33 p.
2009-4	Mark G. Leijssen	Why empirical cost functions get scale economies wrong, 11 p.
2009-5	Peter Nijkamp Galit Cohen-Blankshtain	The importance of ICT for cities: e-governance and cyber perceptions, 14 p.
2009-6	Eric de Noronha Vaz Mário Caetano Peter Nijkamp	Trapped between antiquity and urbanism. A multi-criteria assessment model of the greater Cairo metropolitan area, 22 p.
2009-7	Eric de Noronha Vaz Teresa de Noronha Vaz Peter Nijkamp	Spatial analysis for policy evaluation of the rural world: Portuguese agriculture in the last decade, 16 p.
2009-8	Teresa de Noronha Vaz Peter Nijkamp	Multitasking in the rural world: Technological change and sustainability, 20 p.
2009-9	Maria Teresa Borzacchiello Vincenzo Torrieri Peter Nijkamp	An operational information systems architecture for assessing sustainable transportation planning: Principles and design, 17 p.
2009-10	Vincenzo Del Giudice Pierfrancesco De Paola Francesca Torrieri Francesca Pagliari Peter Nijkamp	A decision support system for real estate investment choice, 16 p.
2009-11	Miruna Mazurencu Marinescu Peter Nijkamp	IT companies in rough seas: Predictive factors for bankruptcy risk in Romania, 13 p.
2009-12	Boriana Rukanova Helle Zinner Hendriksen Eveline van Stijn Yao-Hua Tan	Bringing is innovation in a highly-regulated environment: A collective action perspective, 33 p.
2009-13	Patricia van Hemert Peter Nijkamp Jolanda Verbraak	Evaluating social science and humanities knowledge production: an exploratory analysis of dynamics in science systems, 20 p.

2009-14	Roberto Patuelli Aura Reggiani Peter Nijkamp Norbert Schanne	Neural networks for cross-sectional employment forecasts: A comparison of model specifications for Germany, 15 p.
2009-15	André de Waal Karima Kourtit Peter Nijkamp	The relationship between the level of completeness of a strategic performance management system and perceived advantages and disadvantages, 19 p.
2009-16	Vincenzo Punzo Vincenzo Torrieri Maria Teresa Borzacchiello Biagio Ciuffo Peter Nijkamp	Modelling intermodal re-balance and integration: planning a sub-lagoon tube for Venezia, 24 p.
2009-17	Peter Nijkamp Roger Stough Mediha Sahin	Impact of social and human capital on business performance of migrant entrepreneurs – a comparative Dutch-US study, 31 p.
2009-18	Dres Creal	A survey of sequential Monte Carlo methods for economics and finance, 54 p.
2009-19	Karima Kourtit André de Waal	Strategic performance management in practice: Advantages, disadvantages and reasons for use, 15 p.
2009-20	Karima Kourtit André de Waal Peter Nijkamp	Strategic performance management and creative industry, 17 p.
2009-21	Eric de Noronha Vaz Peter Nijkamp	Historico-cultural sustainability and urban dynamics – a geo-information science approach to the Algarve area, 25 p.
2009-22	Roberta Capello Peter Nijkamp	Regional growth and development theories revisited, 19 p.
2009-23	M. Francesca Cracolici Miranda Cuffaro Peter Nijkamp	Tourism sustainability and economic efficiency – a statistical analysis of Italian provinces, 14 p.
2009-24	Caroline A. Rodenburg Peter Nijkamp Henri L.F. de Groot Erik T. Verhoef	Valuation of multifunctional land use by commercial investors: A case study on the Amsterdam Zuidas mega-project, 21 p.
2009-25	Katrin Oltmer Peter Nijkamp Raymond Florax Floor Brouwer	Sustainability and agri-environmental policy in the European Union: A meta-analytic investigation, 26 p.
2009-26	Francesca Torrieri Peter Nijkamp	Scenario analysis in spatial impact assessment: A methodological approach, 20 p.
2009-27	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Beauty is in the eyes of the beholder: A logistic regression analysis of sustainability and locality as competitive vehicles for human settlements, 14 p.

2009-28	Marco Percoco Peter Nijkamp	Individual time preferences and social discounting in environmental projects, 24 p.
2009-29	Peter Nijkamp Maria Abreu	Regional development theory, 12 p.
2009-30	Tüzin Baycan-Levent Peter Nijkamp	7 FAQs in urban planning, 22 p.
2009-31	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Turkey's rurality: A comparative analysis at the EU level, 22 p.
2009-32	Frank Bruinsma Karima Kourtit Peter Nijkamp	An agent-based decision support model for the development of e-services in the tourist sector, 21 p.
2009-33	Mediha Sahin Peter Nijkamp Marius Rietdijk	Cultural diversity and urban innovativeness: Personal and business characteristics of urban migrant entrepreneurs, 27 p.
2009-34	Peter Nijkamp Mediha Sahin	Performance indicators of urban migrant entrepreneurship in the Netherlands, 28 p.
2009-35	Manfred M. Fischer Peter Nijkamp	Entrepreneurship and regional development, 23 p.
2009-36	Faroek Lazrak Peter Nijkamp Piet Rietveld Jan Rouwendal	Cultural heritage and creative cities: An economic evaluation perspective, 20 p.
2009-37	Enno Masurel Peter Nijkamp	Bridging the gap between institutions of higher education and small and medium-size enterprises, 32 p.
2009-38	Francesca Medda Peter Nijkamp Piet Rietveld	Dynamic effects of external and private transport costs on urban shape: A morphogenetic perspective, 17 p.
2009-39	Roberta Capello Peter Nijkamp	Urban economics at a cross-yard: Recent theoretical and methodological directions and future challenges, 16 p.
2009-40	Enno Masurel Peter Nijkamp	The low participation of urban migrant entrepreneurs: Reasons and perceptions of weak institutional embeddedness, 23 p.
2009-41	Patricia van Hemert Peter Nijkamp	Knowledge investments, business R&D and innovativeness of countries. A qualitative meta-analytic comparison, 25 p.
2009-42	Teresa de Noronha Vaz Peter Nijkamp	Knowledge and innovation: The strings between global and local dimensions of sustainable growth, 16 p.
2009-43	Chiara M. Traversi Peter Nijkamp	Managing environmental risk in agriculture: A systematic perspective on the potential of quantitative policy-oriented risk valuation, 19 p.
2009-44	Sander de Leeuw	Logistics aspects of emergency preparedness in flood disaster prevention, 24 p.

Iris F.A. Vis
Sebastiaan B. Jonkman

- | | | |
|---------|---|---|
| 2009-45 | Eveline S. van Leeuwen
Peter Nijkamp | Social accounting matrices. The development and application of SAMs at the local level, 26 p. |
| 2009-46 | Tibert Verhagen
Willemijn van Dolen | The influence of online store characteristics on consumer impulsive decision-making: A model and empirical application, 33 p. |
| 2009-47 | Eveline van Leeuwen
Peter Nijkamp | A micro-simulation model for e-services in cultural heritage tourism, 23 p. |
| 2009-48 | Andrea Caragliu
Chiara Del Bo
Peter Nijkamp | Smart cities in Europe, 15 p. |
| 2009-49 | Farook Lazrak
Peter Nijkamp
Piet Rietveld
Jan Rouwendal | Cultural heritage: Hedonic prices for non-market values, 11 p. |
| 2009-50 | Eric de Noronha Vaz
João Pedro Bernardes
Peter Nijkamp | Past landscapes for the reconstruction of Roman land use: Eco-history tourism in the Algarve, 23 p. |
| 2009-51 | Eveline van Leeuwen
Peter Nijkamp
Teresa de Noronha Vaz | The Multi-functional use of urban green space, 12 p. |
| 2009-52 | Peter Bakker
Carl Koopmans
Peter Nijkamp | Appraisal of integrated transport policies, 20 p. |
| 2009-53 | Luca De Angelis
Leonard J. Paas | The dynamics analysis and prediction of stock markets through the latent Markov model, 29 p. |
| 2009-54 | Jan Anne Annema
Carl Koopmans | Een lastige praktijk: Ervaringen met waarderen van omgevingskwaliteit in de kosten-batenanalyse, 17 p. |
| 2009-55 | Bas Straathof
Gert-Jan Linders | Europe's internal market at fifty: Over the hill? 39 p. |
| 2009-56 | Joaquim A.S. Gromicho
Jelke J. van Hoorn
Francisco Saldanha-da-Gama
Gerrit T. Timmer | Exponentially better than brute force: solving the job-shop scheduling problem optimally by dynamic programming, 14 p. |
| 2009-57 | Carmen Lee
Roman Kraeussl
Leo Paas | The effect of anticipated and experienced regret and pride on investors' future selling decisions, 31 p. |
| 2009-58 | René Sitters | Efficient algorithms for average completion time scheduling, 17 p. |

2009-59	Masood Gheasi Peter Nijkamp Piet Rietveld	Migration and tourist flows, 20 p.
---------	---	------------------------------------

2010-1	Roberto Patuelli Norbert Schanne Daniel A. Griffith Peter Nijkamp	Persistent disparities in regional unemployment: Application of a spatial filtering approach to local labour markets in Germany, 28 p.
2010-2	Thomas de Graaff Ghebre Debrezion Piet Rietveld	Schaalsprong Almere. Het effect van bereikbaarheidsverbeteringen op de huizenprijzen in Almere, 22 p.
2010-3	John Steenbruggen Maria Teresa Borzacchiello Peter Nijkamp Henk Scholten	Real-time data from mobile phone networks for urban incidence and traffic management – a review of application and opportunities, 23 p.
2010-4	Marc D. Bahlmann Tom Elfring Peter Groenewegen Marleen H. Huysman	Does distance matter? An ego-network approach towards the knowledge-based theory of clusters, 31 p.
2010-5	Jelke J. van Hoorn	A note on the worst case complexity for the capacitated vehicle routing problem, 3 p.
2010-6	Mark G. Lijesen	Empirical applications of spatial competition; an interpretative literature review, 16 p.
2010-7	Carmen Lee Roman Kraeussl Leo Paas	Personality and investment: Personality differences affect investors' adaptation to losses, 28 p.
2010-8	Nahom Ghebrihiwet Evgenia Motchenkova	Leniency programs in the presence of judicial errors, 21 p.
2010-9	Meindert J. Flikkema Ard-Pieter de Man Matthijs Wolters	New trademark registration as an indicator of innovation: results of an explorative study of Benelux trademark data, 53 p.
2010-10	Jani Merikivi Tibert Verhagen Frans Feldberg	Having belief(s) in social virtual worlds: A decomposed approach, 37 p.
2010-11	Umut Kilingç	Price-cost markups and productivity dynamics of entrant plants, 34 p.
2010-12	Umut Kilingç	Measuring competition in a frictional economy, 39 p.

2011-1	Yoshifumi Takahashi Peter Nijkamp	Multifunctional agricultural land use in sustainable world, 25 p.
2011-2	Paulo A.L.D. Nunes Peter Nijkamp	Biodiversity: Economic perspectives, 37 p.
2011-3	Eric de Noronha Vaz Doan Nainggolan Peter Nijkamp Marco Painho	A complex spatial systems analysis of tourism and urban sprawl in the Algarve, 23 p.
2011-4	Karima Kourtit Peter Nijkamp	Strangers on the move. Ethnic entrepreneurs as urban change actors, 34 p.
2011-5	Manie Geyer Helen C. Coetzee Danie Du Plessis Ronnie Donaldson Peter Nijkamp	Recent business transformation in intermediate-sized cities in South Africa, 30 p.
2011-6	Aki Kangasharju Christophe Tavera Peter Nijkamp	Regional growth and unemployment. The validity of Okun's law for the Finnish regions, 17 p.
2011-7	Amitrajeet A. Batabyal Peter Nijkamp	A Schumpeterian model of entrepreneurship, innovation, and regional economic growth, 30 p.
2011-8	Aliye Ahu Akgün Tüzin Baycan Levent Peter Nijkamp	The engine of sustainable rural development: Embeddedness of entrepreneurs in rural Turkey, 17 p.
2011-9	Aliye Ahu Akgün Eveline van Leeuwen Peter Nijkamp	A systemic perspective on multi-stakeholder sustainable development strategies, 26 p.
2011-10	Tibert Verhagen Jaap van Nes Frans Feldberg Willemijn van Dolen	Virtual customer service agents: Using social presence and personalization to shape online service encounters, 48 p.
2011-11	Henk J. Scholten Maarten van der Vlist	De inrichting van crisisbeheersing, de relatie tussen besluitvorming en informatievoorziening. Casus: Warroom project Netcentrisch werken bij Rijkswaterstaat, 23 p.
2011-12	Tüzin Baycan Peter Nijkamp	A socio-economic impact analysis of cultural diversity, 22 p.
2011-13	Aliye Ahu Akgün Tüzin Baycan Peter Nijkamp	Repositioning rural areas as promising future hot spots, 22 p.
2011-14	Selmar Meents Tibert Verhagen Paul Vlaar	How sellers can stimulate purchasing in electronic marketplaces: Using information as a risk reduction signal, 29 p.

2011-15	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Measuring regional creative capacity: A literature review for rural-specific approaches, 22 p.
2011-16	Frank Bruinsma Karima Kourtit Peter Nijkamp	Tourism, culture and e-services: Evaluation of e-services packages, 30 p.
2011-17	Peter Nijkamp Frank Bruinsma Karima Kourtit Eveline van Leeuwen	Supply of and demand for e-services in the cultural sector: Combining top-down and bottom-up perspectives, 16 p.
2011-18	Eveline van Leeuwen Peter Nijkamp Piet Rietveld	Climate change: From global concern to regional challenge, 17 p.
2011-19	Eveline van Leeuwen Peter Nijkamp	Operational advances in tourism research, 25 p.
2011-20	Aliye Ahu Akgün Tüzin Baycan Peter Nijkamp	Creative capacity for sustainable development: A comparative analysis of European and Turkish rural regions, 18 p.
2011-21	Aliye Ahu Gülümser Tüzin Baycan-Levent Peter Nijkamp	Business dynamics as the source of counterurbanisation: An empirical analysis of Turkey, 18 p.
2011-22	Jessie Bakens Peter Nijkamp	Lessons from migration impact analysis, 19 p.
2011-23	Peter Nijkamp Galit Cohen-blankshtain	Opportunities and pitfalls of local e-democracy, 17 p.
2011-24	Maura Soekijad Irene Skovgaard Smith	The 'lean people' in hospital change: Identity work as social differentiation, 30 p.
2011-25	Evgenia Motchenkova Olgerd Rus	Research joint ventures and price collusion: Joint analysis of the impact of R&D subsidies and antitrust fines, 30 p.
2011-26	Karima Kourtit Peter Nijkamp	Strategic choice analysis by expert panels for migration impact assessment, 41 p.
2011-27	Farook Lazrak Peter Nijkamp Piet Rietveld Jan Rouwendal	The market value of listed heritage: An urban economic application of spatial hedonic pricing, 24 p.
2011-28	Peter Nijkamp	Socio-economic impacts of heterogeneity among foreign migrants: Research and policy challenges, 17 p.
2011-29	Masood Gheasi Peter Nijkamp	Migration, tourism and international trade: Evidence from the UK, 8 p.
2011-30	Karima Kourtit	Evaluation of cyber-tools in cultural tourism, 24 p.

	Peter Nijkamp Eveline van Leeuwen Frank Bruinsma	
2011-31	Cathy Macharis Peter Nijkamp	Possible bias in multi-actor multi-criteria transportation evaluation: Issues and solutions, 16 p.
2011-32	John Steenbruggen Maria Teresa Borzacchiello Peter Nijkamp Henk Scholten	The use of GSM data for transport safety management: An exploratory review, 29 p.
2011-33	John Steenbruggen Peter Nijkamp Jan M. Smits Michel Grothe	Traffic incident management: A common operational picture to support situational awareness of sustainable mobility, 36 p.
2011-34	Tüzin Baycan Peter Nijkamp	Students' interest in an entrepreneurial career in a multicultural society, 25 p.
2011-35	Adele Finco Deborah Bentivoglio Peter Nijkamp	Integrated evaluation of biofuel production options in agriculture: An exploration of sustainable policy scenarios, 16 p.
2011-36	Eric de Noronha Vaz Pedro Cabral Mário Caetano Peter Nijkamp Marco Painho	Urban heritage endangerment at the interface of future cities and past heritage: A spatial vulnerability assessment, 25 p.
2011-37	Maria Giaoutzi Anastasia Stratigea Eveline van Leeuwen Peter Nijkamp	Scenario analysis in foresight: AG2020, 23 p.
2011-38	Peter Nijkamp Patricia van Hemert	Knowledge infrastructure and regional growth, 12 p.
2011-39	Patricia van Hemert Enno Masurel Peter Nijkamp	The role of knowledge sources of SME's for innovation perception and regional innovation policy, 27 p.
2011-40	Eric de Noronha Vaz Marco Painho Peter Nijkamp	Impacts of environmental law and regulations on agricultural land-use change and urban pressure: The Algarve case, 18 p.
2011-41	Karima Kourtit Peter Nijkamp Steef Lowik Frans van Vught Paul Vulto	From islands of innovation to creative hotspots, 26 p.
2011-42	Alina Todiras Peter Nijkamp Saidas Rafijevas	Innovative marketing strategies for national industrial flagships: Brand repositioning for accessing upscale markets, 27 p.

2011-43	Eric de Noronha Vaz Mário Caetano Peter Nijkamp	A multi-level spatial urban pressure analysis of the Giza Pyramid Plateau in Egypt, 18 p.
2011-44	Andrea Caragliu Chiara Del Bo Peter Nijkamp	A map of human capital in European cities, 36 p.
2011-45	Patrizia Lombardi Silvia Giordano Andrea Caragliu Chiara Del Bo Mark Deakin Peter Nijkamp Karima Kourtiti	An advanced triple-helix network model for smart cities performance, 22 p.
2011-46	Jessie Bakens Peter Nijkamp	Migrant heterogeneity and urban development: A conceptual analysis, 17 p.
2011-47	Irene Casas Maria Teresa Borzacchiello Biagio Ciuffo Peter Nijkamp	Short and long term effects of sustainable mobility policy: An exploratory case study, 20 p.
2011-48	Christian Bogmans	Can globalization outweigh free-riding? 27 p.
2011-49	Karim Abbas Bernd Heidergott Djamil Aïssani	A Taylor series expansion approach to the functional approximation of finite queues, 26 p.
2011-50	Eric Koomen	Indicators of rural vitality. A GIS-based analysis of socio-economic development of the rural Netherlands, 17 p.

2012-1	Aliye Ahu Gülümser Tüzin Baycan Levent Peter Nijkamp Jacques Poot	The role of local and newcomer entrepreneurs in rural development: A comparative meta-analytic study, 39 p.
2012-2	Joao Romao Bart Neuts Peter Nijkamp Eveline van Leeuwen	Urban tourist complexes as Multi-product companies: Market segmentation and product differentiation in Amsterdam, 18 p.
2012-3	Vincent A.C. van den Berg	Step tolling with price sensitive demand: Why more steps in the toll makes the consumer better off, 20 p.
2012-4	Vasco Diogo Eric Koomen Floor van der Hilst	Second generation biofuel production in the Netherlands. A spatially-explicit exploration of the economic viability of a perennial biofuel crop, 12 p.
2012-5	Thijs Dekker Paul Koster Roy Brouwer	Changing with the tide: Semi-parametric estimation of preference dynamics, 50 p.
2012-6	Daniel Arribas Karima Kourtit Peter Nijkamp	Benchmarking of world cities through self-organizing maps, 22 p.
2012-7	Karima Kourtit Peter Nijkamp Frans van Vught Paul Vulto	Supernova stars in knowledge-based regions, 24 p.
2012-8	Mediha Sahin Tüzin Baycan Peter Nijkamp	The economic importance of migrant entrepreneurship: An application of data envelopment analysis in the Netherlands, 16 p.
2012-9	Peter Nijkamp Jacques Poot	Migration impact assessment: A state of the art, 48 p.
2012-10	Tibert Verhagen Anniek Nauta Frans Feldberg	Negative online word-of-mouth: Behavioral indicator or emotional release? 29 p.

2013-1	Tüzin Baycan Peter Nijkamp	The migration development nexus: New perspectives and challenges, 22 p.
2013-2	Haralambie Leahu	European Options Sensitivities via Monte Carlo Techniques, 28 p.
2013-3	Tibert Verhagen Charlotte Vonkeman Frans Feldberg Plon Verhagen	Making online products more tangible and likeable: The role of local presence as product presentation mechanism, 44 p.
2013-4	Aliye Ahu Akgün Eveline van Leeuwen Peter Nijkamp	A Multi-actor multi-criteria scenario analysis of regional sustainable resource policy, 24 p.
2013-5	John Steenbruggen Peter Nijkamp Maarten van der Vlist	Urban traffic incident management in a digital society. An actor-network approach in information technology use in urban Europe, 25 p.
2013-6	Jorge Ridderstaat Robertico Croes Peter Nijkamp	The force field of tourism, 19 p.
2013-7	Masood Gheasi Peter Nijkamp Piet Rietveld	Unknown diversity: A study on undocumented migrant workers in the Dutch household sector, 17 p.
2013-8	Mediha Sahin Peter Nijkamp Soushi Suzuki	Survival of the fittest among migrant entrepreneurs. A study on differences in the efficiency performance of migrant entrepreneurs in Amsterdam by means of data envelopment analysis, 25 p.
2013-9	Kostas Bithas Peter Nijkamp	Biological integrity as a prerequisite for sustainable development: A bioeconomic perspective, 24 p.
2013-10	Madalina-Stefania Dirzu Peter Nijkamp	The dynamics of agglomeration processes and their contribution to regional development across the EU, 19 p.